

**REMARKS**

Upon entry of this amendment, claims 18-41 will be pending. Claims 21, 22, 27, and 33 have been amended and claims 35-41 have been added. No new matter has been added.

As a preliminary matter, the Office Action states that claims 21, 22, 25-28, 33, and 34 would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. Applicants appreciate the Examiner's indication of this allowable subject matter. As suggested, Applicants have amended claims 21 and 33 to be independent claims that incorporate the limitations of the base claim and intervening claims. Further, Applicants have amended claim 22 to depend from claim 21. New claims 35-41 also depend from claim 21. Accordingly, it is respectfully submitted that claims 21, 22, and 33-41 are in condition for allowance.

Applicants respectfully submit that claims 18-20, and 23-32 are also in condition for allowance. Applicants' claims are directed to field emission cathodes and field emission displays that comprise a polymer material. Applicants have discovered that the polymer materials are capable of producing high steady state field emission currents. Further, the threshold field needed to initiate field emission with the polymer materials is small compared to previous attempts. Using Applicants' claimed inventions, improved field emission cathodes and field emission displays can be produced that are light and economical.

**I. The Claimed Inventions are Novel**

Claims 18-20, 23, 24, 29, 31, and 32 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by EP 0 399 299 A2 (the "Angelopoulos reference").

Specifically, the Office Action asserts that the Angelopoulos reference discloses a "field emission cathode comprising a polymer material forming a field emission surface." Applicants disagree. Accordingly, Applicants traverse the rejection and request reconsideration because the Angelopoulos reference does not suggest the use of a polymer material for forming a field emission surface as recited in Applicants' claims.

The Angelopoulos reference discloses polymer materials and, in particular, their use as "electrically conductive resists" (page 2, lines 1-2). The Angelopoulos reference suggests that such polymer material can be used to create a resist that functions as "an electrical discharge layer" (page 3, lines 6-7). The "electrical discharge layer" disclosed in the Angelopoulos reference, however, is in no way equivalent to a "field emission cathode" as recited in Applicants' claims.

The passage in the Angelopoulos reference beginning on page 2, line 38, and ending at page 3, line 5, provides the context from which the meaning of the term "electrical discharge layer" can be appreciated. In electron beam lithography, an item incorporating a layer of resist material is exposed to an electron beam. If the resist material is a dielectric, then it becomes charged by the incident electrons. This is undesirable because an accumulation of charge on the surface creates an electric field that distorts the electron beam on the surface, resulting in a loss of precision and displacement errors. It is thus desirable to provide an electrical conductor that can discharge the electrons accumulated from the beam. Essentially, the "electrical discharge" referred to in the Angelopoulos reference merely concerns the conduction of the electrons to avoid charging the resist. To serve this purpose, the resist material in question merely needs to be electrically conductive.

The Angelopoulos reference suggests other uses for the specified polymer materials on page 16, lines 22-28, such as an electromagnetic interference coating on a dielectric surface. Again, these applications exploit the fact that the polymer materials are conductive. Nowhere does the Angelopoulos reference disclose a "field emission cathode comprising a polymer material forming a field emission surface."

Further, the fact that the materials referred to in the Angelopoulos reference are conductive does not in any way suggest that they should be used in field emission applications. The term "field emission" is well understood by those skilled in the art. The PCT International Preliminary Examination Report correctly summed up the teaching of the Angelopoulos reference by stating: "[Angelopoulos] is concerned with electroconductive polymeric materials, a part of which are conjugated polymeric materials. However, there is no indication to use these materials in field emission devices".

Thus, the Angelopoulos reference does not teach or suggest the use of a polymer material in a field emission cathode, as recited in Applicants' claims. Accordingly, Applicants respectfully request that this rejection under 35 U.S.C. § 102(b) be withdrawn.

## **II. The Claimed Inventions are Not Obvious**

Claim 30 stands rejected under 35 U.S.C. § 103(a) as allegedly being obvious over U.S. Pat. No. 5,548,185 (the "Kumar reference") in view of the Angelopoulos reference. Applicants respectfully traverse this rejection because, as stated above, the Angelopoulos reference fails to teach or suggest the use of a polymer material for field emission. As acknowledged in the Office Action, the Kumar reference also fails to teach or suggest a field

emission cathode comprising a polymer material. Accordingly, the combination of the Kumar reference and the Angelopoulos references would not have produced the claimed invention.

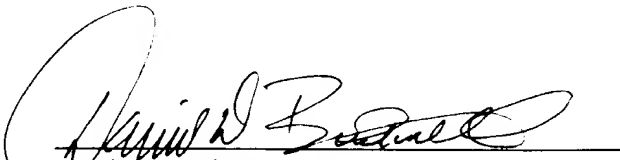
Further, the Office Action fails to provide an adequate reason as to why one of ordinary skill in the art would have been led to modify the Kumar reference to include a polymer material. The only motivation provided by the Office Action concerns the ease of removal of the polymer compared to metal. Significantly, the Office Action fails to identify where the Kumar reference considers the "ease of removal" in its teachings.

Accordingly, the Office Action fails to make out a *prima facie* case of obviousness. Applicants respectfully request that the rejection under 35 U.S.C. § 103(a) be withdrawn.

### III. Conclusion

In view of the foregoing, Applicants respectfully submit that the claims are in condition for allowance. An early notice of the same is earnestly solicited. The Examiner is invited to contact Applicants' undersigned representative at (215) 557-5963 if there are any questions regarding Applicants' claimed inventions.

Date: August 13, 2003



Daniel D. Biesterveld  
Registration No. 45,898

Woodcock Washburn LLP  
One Liberty Place - 46th Floor  
Philadelphia PA 19103  
Telephone: (215) 568-3100  
Facsimile: (215) 568-3439